Name: Date:

Polynomial Factoring solution (version 636)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 - 6x + 36 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(36)}}{2(1)}$$

$$x = \frac{-(-6) \pm \sqrt{36 - 144}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{-108}}{2}$$

$$x = \frac{6 \pm \sqrt{-36 \cdot 3}}{2}$$

$$x = \frac{6 \pm 6\sqrt{3}\, i}{2}$$

$$x = 3 \pm 3\sqrt{3}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $4 + 3i$ and $-9 - 7i$ in standard form $(a + bi)$.**

Solution

$$(4 + 3i) \cdot (-9 - 7i)$$

$$-36 - 28i - 27i - 21i^2$$

$$-36 - 28i - 27i + 21$$

$$-36 + 21 - 28i - 27i$$

$$-15 - 55i$$

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3. **Write function $f(x) = x^3 - 2x^2 - 23x + 60$ in factored form. I'll give you a hint: one factor is $(x - 3)$.**

Solution

	1	-2	-23	60
3		3	3	-60
	1	1	-20	0

$$f(x) = (x-3)(x^2 + x - 20)$$

$$f(x) = (x-3)(x+5)(x-4)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = (x+6)^2 \cdot (x+1)^2 \cdot (x-2)^2 \cdot (x-5)$$

Sketch a graph of polynomial $y = p(x)$.